202201UECM3473OE4b

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Review of preview

Started on	Friday, 1 April 2022, 01:36 PM
Completed on	Friday, 1 April 2022, 01:36 PM
Time taken	6 secs
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

You are given;

- The number of claims follows a binomial distribution with parameters m=6 and λ.
- Claim sizes follow a distribution with mean σ and variance $2\sigma^2$.
- The number of claims and claim sizes are independent.
- λ and σ have a prior probability distribution with joint density function

$$f(\lambda, \sigma) = k\lambda^4(9-\sigma)^2 \text{ , } 0 < \lambda < 1, 0 < \sigma < 9.$$

- During the first year we observe 3 claims and the claims are 3, 3, and 4.
- During the second year we observe 2 claims and the claims are 5, and 4.

Determine the Buhlmann estimate of the expected aggregate loss for the third year. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 10.106936
Marks for this submission: 0/1.

2

Marks: 1

Number of claims for each member of a group follows a Poisson distribution with mean λ. λ varies by insured according to a uniform distribution on (0, 0.30000000000000004).
You are given three years of experience for the group:

Year	Number of members	Number of claims
1	140	4
2	150	6
3	200	7

The group will have 240 members in year 4. Calculate the Buhlmann credibility premium for the group in year 4. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 9.411765
Marks for this submission: 0/1.

3

Marks: 1

For each exposure in a group, the hypothetical mean of aggregate losses is Θ and the process variance is $e^{0.42\theta}$. Θ varies by group. Its distribution is gamma with α = 3 and β = 1.57. For three years experience from a group, you have the following data:

Year	Exposures	Aggregate Losses
1	30	76
2	32	92
3	31	139

There will be 38 exposures in the group next year. Calculate the Buhlmann-Straub credibility premium for the group. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 127.3418
Marks for this submission: 0/1.

4
Marks: 1

For a portfolio of insurance risk, aggregate losses per year per exposure follow a normal distribution with mean θ and variance 1,800,000. Θ varies by class, as indicated in the following table:

Class	Mean Aggregate Losses Per Year Per Exposure	Percent of Business Class
A	1,100	62%
B	1,600	24%
C	2,100	14%

A random selected risk has the following experience over 3 years.

Year	Number of Exposures	Aggregate Losses
1	15	15,000
2	15	15,000
3	15	16,000

Determine the Buhlmann-Straub estimate of mean aggregate losses per year per exposure in the next year for this risk. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 1100.59
Marks for this submission: 0/1.

5
Marks: 1

For a group dental coverage, you have the following three years of experience from a covered group:

Year	Number of members in group	Number of claims	Aggregate claims
2010	120	150	40,000
2011	150	175	50,000
2012	110	160	50,000

There will be 120 members in the next year. The number of claims per member in any year follows a binomial distribution with parameters m = 8 and q. q is the same for all members in the group, but varies over groups, and is distributed uniformly over (0.38, 0.48). Claim size follows a gamma distribution with parameters α = 10, θ = 32. Claim sizes and claim counts are independent. Calculate the Buhlmann-Straub estimate of aggregate claims in the next year. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 53161.305254
Marks for this submission: 0/1.

6
Marks: 1

You are given five classes of insureds, each of whom may have zero or one claim, with the following probabilities:

	Number of claims	
Class	0	1
I	0.82	0.18
II	0.75	0.25
III	0.58	0.42
IV	0.30	0.70
V	0.09	0.91

A class is selected at random (with probability 1/5), and 6 insureds are selected at random from the class. The total number of claims is 2. If 13 insureds are selected at random from the same class, estimate the total number of claims using Buhlmann-Straub credibility. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 4.9036

Marks for this submission: 0/1.

7
Marks: 1

For a portfolio of insurance risks, average aggregate losses per exposure have mean θ and variance 9,000 + 20,000/m_j, where m_j is the number of exposures in year j. θ varies by risk, and has mean 3,000 and variance 20,000. the following is the experience for this risk over 3 years:

Year	Number of Exposures	Average Losses Per Exposure
1	25	1,500
2	40	2,000
3	35	2,200

Determine the Buhlmann-Straub estimate of average aggregate losses per exposure in the next year for this risk. _____

Answer: ✗

Make comment or override grade

Incorrect
Correct answer: 2054.94
Marks for this submission: 0/1.

8
Marks: 1

You are given the following information about a credibility model:

Observed Losses	Probability	Bayesian Estimate
10	3/10	19.13
12	2/10	20.03
26	2/10	26.33
36	2/10	30.83
50	1/10	y_5

Determine the Buhmann credibility estimate of the second observation, given that the first observation is 26. _____

Answer: ✗

Make comment or override grade

Incorrect
Correct answer: 23.247888
Marks for this submission: 0/1.

9
Marks: 1

For a group dental coverage, you have the following three years of experience from a covered group:

Year	Number of members in group	Number of claims	Aggregate claims
2010	120	150	39,000
2011	140	175	48,000
2012	110	160	48,000

There will be 170 members in the next year. The number of claims per member in any year follows a binomial distribution with parameters m=3 and q. q is the same for all members in the group, but varies over groups, and is distributed uniformly over (0.44, 0.54). Claim size follows a gamma distribution with parameters α = 10, θ = 35. Claim sizes and claim counts are independent. Calculate the Buhlmann-Straub estimate of aggregate claims in the next year. _____

Answer: ✗

Make comment or override grade

Incorrect
Correct answer: 68226.371689
Marks for this submission: 0/1.

10
Marks: 1

You are given the following:

- A portfolio of risks consists of two classes, A and B.
- The number of claims per year per risk is the same for each member in a class. The distribution for each class is:

class	Number of Claims			
	0	1	2	3
A	0.35	0.28	0.26	0.11
B	0.45	0.24	0.15	0.16

- Class A has 2 times as many insureds as Class B.
- Customers insure risks, all of which must belong to the same class.

A randomly selected customer has the following experience:

- In year 1 the customer insurers 4 risks and has 6 claims.
- In year 2 the customer insurers 6 risks and has 7 claims.

In year 3 the customer seeks to insure 10 risks.
Determine the Buhlmann-Straub estimate of the number of claims for this customer for year 3. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 10.982562

Marks for this submission: 0/1.